Light Weight Solutions: Building Grids for People (Rick's Early Adopters)

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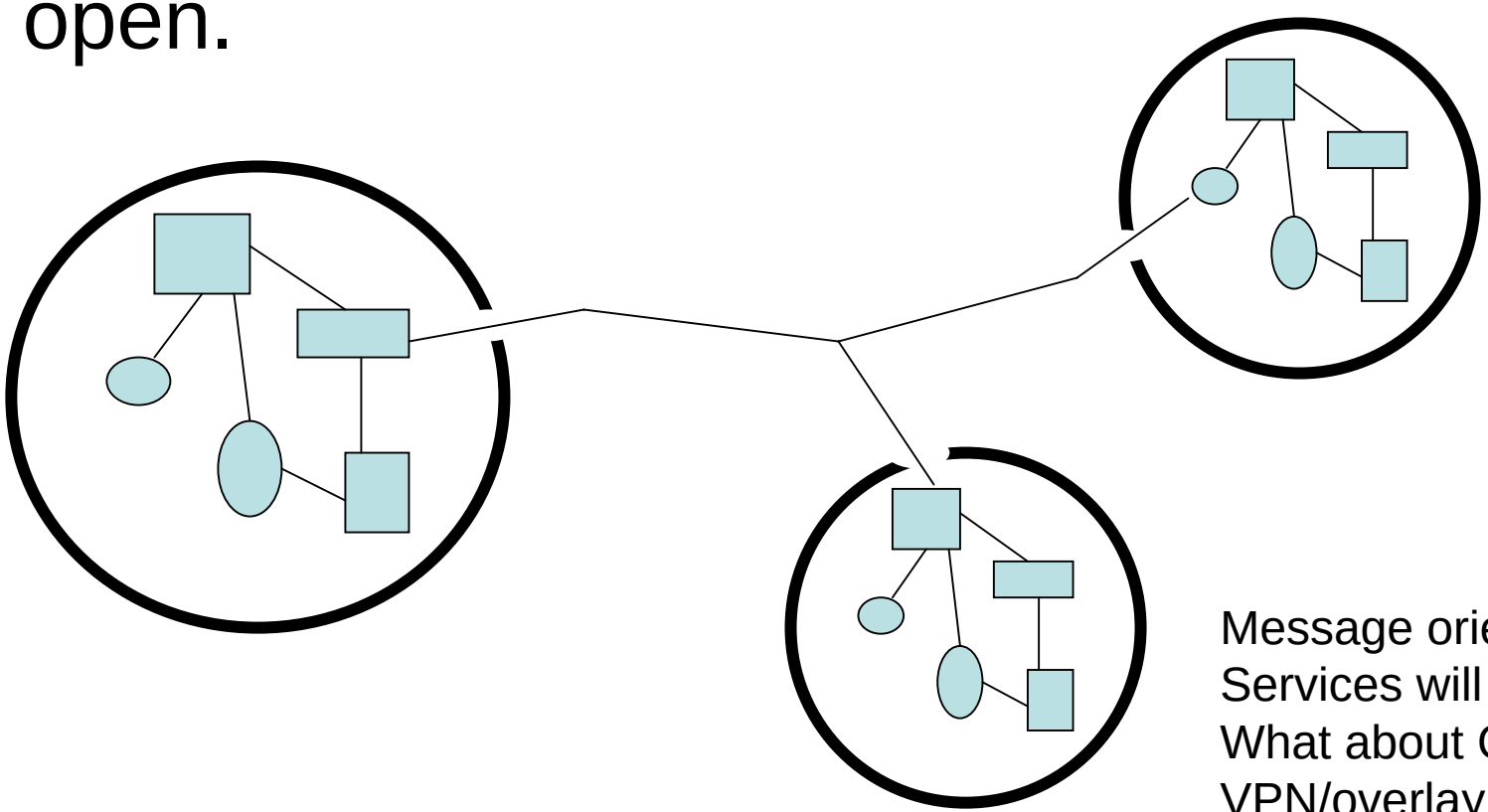
(not the opinion of his good collaborators)

What does the Grid give them now?

- Unfriendly security systems.
- Job Submission
  - Access to servers and not services
- Good for some communities
  - High energy physics is the best example.
  - Of little interest to the majority of potential users.
    - Larry's "Knowledge Grid" is a better model.
- For collaboration:
  - Access Grid
    - – *getting better!* But IP-multicast remains a problem.
  - For secure asynchronous collaboration
    - Portal solutions
- Wide open Internet solutions don't work.

The Grid of the Future

- A set of organizational islands that are protected by huge firewalls with one port open.



Message oriented web Services will be essential.
What about Gridftp?
VPN/overlay network may help.

Security issues

- The biggest problem for 90% of people
  - "I don't need an account on the back end. Give me useful services."
  - "Don't make me deal with certificates.
    - Amazon.com, Orbitz, and others do not make me do that. I have a password to use their services.
- Users need "capabilities" to access specific services. They don't need login accounts.
  - A capability for a specific service is not the same as a login account to use the server.
- Application programmers need the ability to provide application services to larger communities of users.

Where does Grid Technology Need to Go?

- The scientific communities that are user-based
  - Environmental Sciences
  - Bio
  - Agriculture
  - Basic Engineering (chem, civil, me, ee)
- What do they need?
  - Access to services
    - Information services
      - Secure discovery, sharing, indexing of knowledge.
    - Computational services
      - Simulation, analysis, visualization
- Frequently asked question:
  - “I have an application that runs on my machine. How do I let my collaborators use it in a secure manner?”

Light Weight Solutions

- A community of collaborators should be able to deploy a “community grid” that
  - Creates a secure shared “information space”
    - Users never see certificates.
    - Data objects can be “published” so that only authorized users can see them.
  - Is based on sharing services and not servers
    - Publish application services to portal
      - Uses interact with portal portlet. Other portals discover and import this portlet as a service.
    - Toolkits which make it easy to deploy apps as services
      - (see David Konerding’s bio component model)
      - A standard notification service is needed
  - Works with firewall constraints
    - All services communicate through portal port 80.
  - Deploys from start to finish in 15 min.

The Portal as a Grid Access Point

- The Portal Server provides the users Grid Context.

OGCE or GridSphere Grid Portal Server

https

SOAP & WS-Security

Open Grid Service Architecture Layer

Registries and Name binding

Policy

Security

Data Management Service

Reservations And Scheduling

Administration & Monitoring

Logging

Accounting Service

Event Service

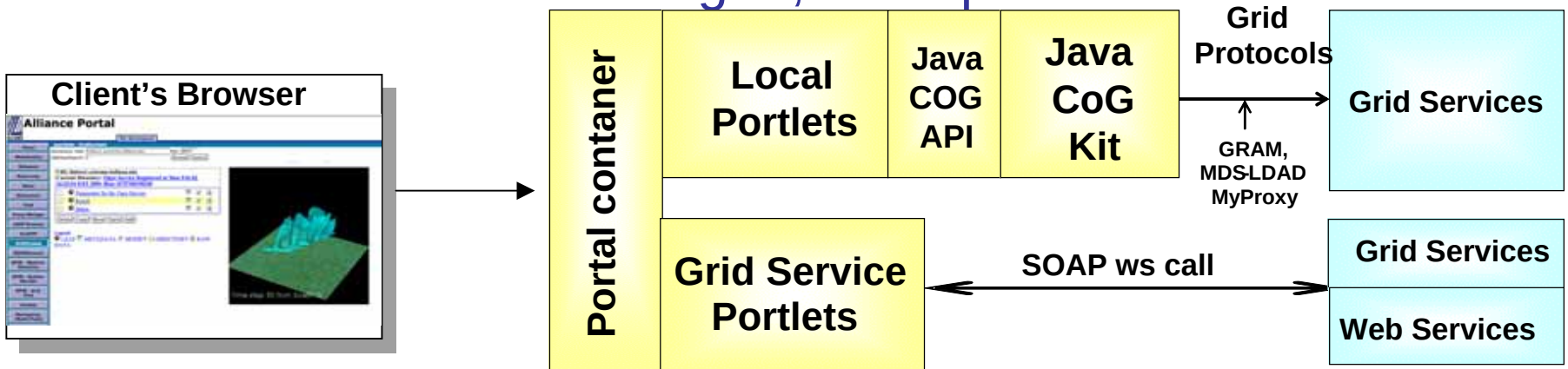
Grid Orchestration

Web Services Resource Framework – Web Services Notification

Physical Resource Layer

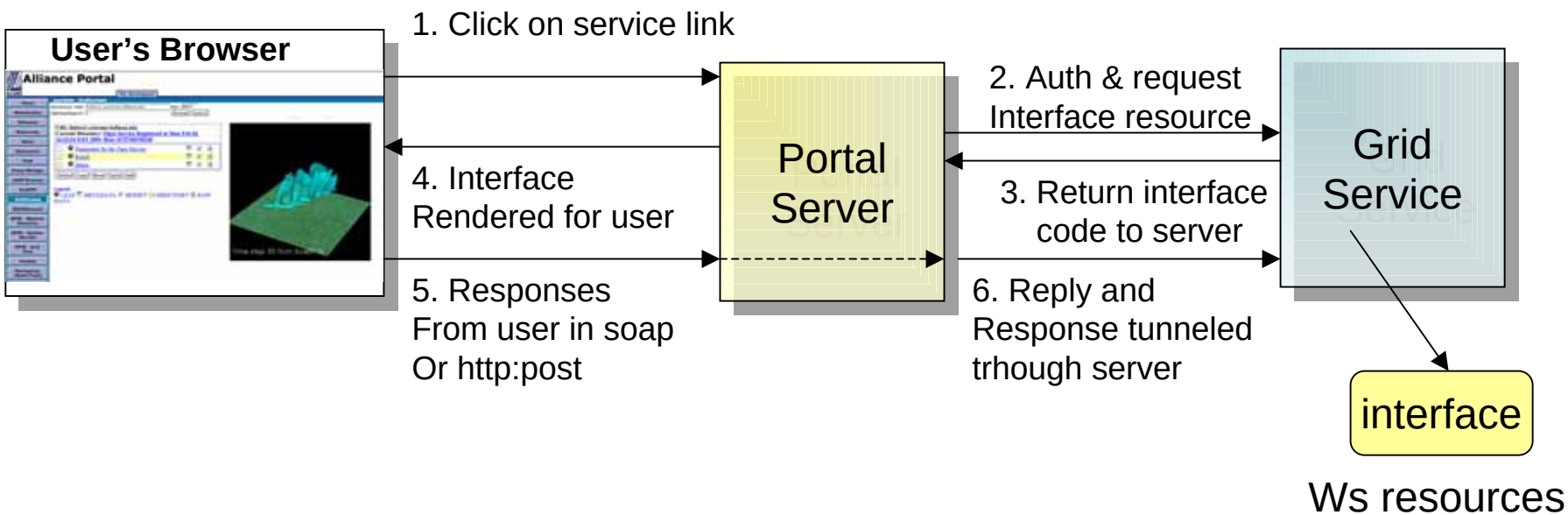
Portal Architecture

- Building on Standard Technologies
  - Portlet Design (JSR-168) IBM, Oracle, Sun, BEA, Apache
  - Grid standards: Java CoG, Web/Grid Services
- User configurable, Service Oriented
- Based on Portlet Design
  - A portlet is a component within the portal that provides the interface between the user and some service
  - Portlets can be exchanged, interoperate



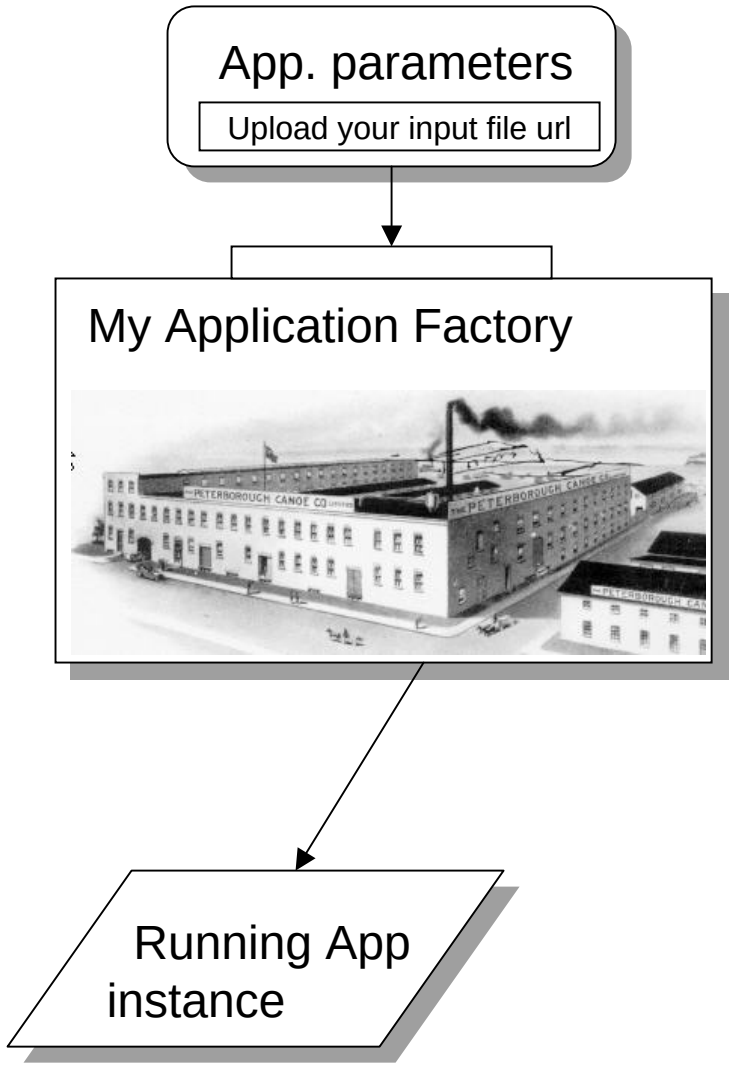
User-Portal-Service Interaction

- Grid Services with user interfaces are mediated by the portal.
  - The Grid service can keep an interface client to itself as a WS resource which can be loaded by the server and presented to the client.
  - Allows security to be https from browser and ws-security from portal server to Grid service.



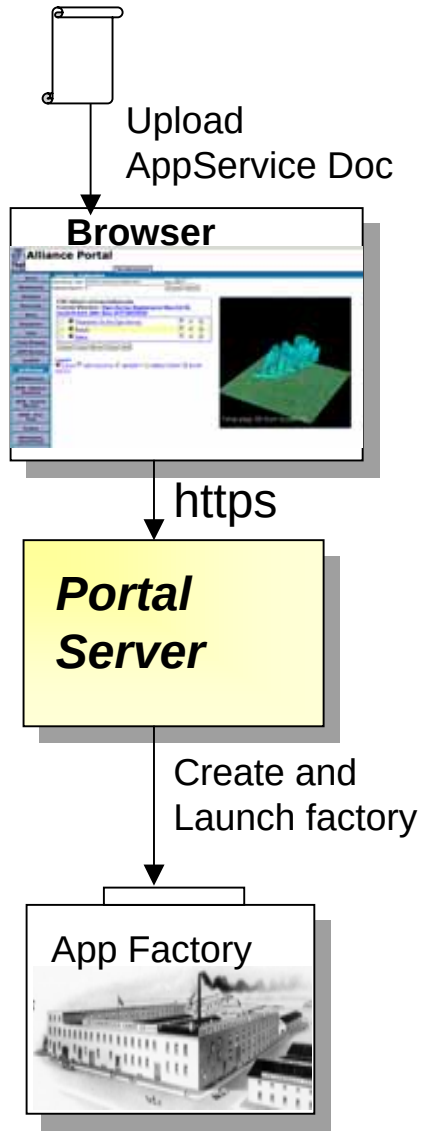
Wrapping Science Apps as Services

- The Factory Pattern
  - A Factory is a web service that creates a running instance of an application for authorized users.
  - A factory client allows app user to:
    - Specify needed input files and other parameters
    - Indicate choice among known execution hosts where app is deployed.



The Portal Factory Service Generator

- Start with
  - A Deployed Application
    - A script to run it.
    - A list of all needed input files
    - A list of all generated output files.
- Write a AppService Document
  - Upload this to the portal Factory generator in the portal.
- A new Factory is started for you.
  - A portal client interface to the factory is also automatically generated.



The Security Model

- The parties:
  - The service provider
    - Usually the application scientist in charge of the app.
  - The user
    - Usually an associate or client of the provider.
    - Is provided a capability token by the provider to run the application.
- The capability token
  - An xml document (SAML) signed by the provider that says the user has permission to access the service.
- The factory service
  - Only accepts requests signed by the user and containing the required capability token.